Sanitized Copy Approved for Release 2011/06/06 : CIA-RDP78B04747A002700010001-1

12 July 1963

Comments on the Coherent Enlarger Proposal:

This instrument has quite obvious possibilities, and the proposal author(s) appears to be aware of most of the problems. There are several aspects of this presentation which I feel should be pointed out - merely as an added viewpoint based on experience in coherence applications.

While the proposal minimizes the ringing due to sharp cutoff (page 6) by stating that the original film will contain only low contrasts at the high spatial frequencies, the problem is by no means eliminated. The edges of the photographic object or the aperture in which the object is contained do have sharp edges of exceedingly high contrast. These will "ring" well into the image area, but will be absent from the center of the field. Such effects are multiplied when the image is printed on a high-gamma material.

On page 13, the statement that non-sharp edges have their "sharpness" improved through removal of the optical "dc" (through insertion of a sharp-cutoff, occluding filter in the center of frequency space) is simply not true. The effect is decidedly spurious, and research at [redacted] has established that it just will not sharpen anything. Further, the ringing due to sharp cutoff filtering will also affect the fine detail (not the high frequencies). The cited Maréchal work was not accomplished with an occluding filter, but with a continuous-tone photographic representation of a sin(x)/x filter having a negative value on the secondary maximum through deposition of a quarter-wave retarding layer. The result was a contrast improvement rather than a sharpening effect.

STAT

On page 15, in which the laser's polarization property was discussed, the largest contributing factor to the systematic birefringence was not even mentioned - the ability to mount the optical elements, fluid gate included, without strain. This will be the largest problem area in terms of the phase coherence they wish to maintain across apertures.

Finally, they have not anticipated the problem attendent to dust, dirt, smudges and scratches on the collimators and fluid gate. This is the greatest single source of image degredation not generated by the optical system, per se. These factors image as out-of-focus objects and contribute ringed images along with the desired object - their effectiveness in masking fine detail is incredibly multiplied when the optical "dc" is removed by filtering.

Swing

Sanitized Copy Approved for Release 2011/06/06 : CIA-RDP78B04747A002700010001-1

Sanitized Copy Approved for Release 2011/06/06 : CIA-RDP78B04747A002700010001-1

[redacted] Contra Folder STAT

NPIC/D-82-64

The Research and Development Project Approval Request on this project is filed in the [redacted] folder on a Study on Photo Interpreter Performance. STAT

Sanitized Copy Approved for Release 2011/06/06 : CIA-RDP78B04747A002700010001-1